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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BAYARD, EMMANUEL	

ART UNIT	PAPER NUMBER
2631	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/976,200	BINSHTOK ET AL.	
	Examiner	Art Unit	
	Emmanuel Bayard	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it is too short. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 1-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Thomas et al U.S. Patent No 6,141,393.

As per claims 1, 10, 15, Thomas et al discloses a method for reducing interference in a communication device comprising: providing a communication device having first and second antenna elements (see figs. 2-3 elements 101 and col.7, line 1) and a combiner (see figs. 2-3 element 202 and col.7, lines 6-40) to combine outputs of said first and second antenna elements,

said first antenna element having an adjustable weight (see fig.3 element 304 and col.7, lines 35-40); determining individual channel responses (see figs.2, 5 element 208 and col.7, line 13 and col.8, lines 1-25) for said first and second antenna elements for each of a plurality of base stations of interest; and determining a weight for said first antenna element that optimizes an interference-related quality criterion based on said individual channel responses (see col.3, lines 18-34 and col.16, line 3-20 and col.18, lines 34-41).

As per claim 2, Thomas et al does teach said communication device includes more than two antenna elements (see fig.2), wherein said combiner combines the outputs of said more than two antenna elements.

As per claim 3, Thomas et al does teach determining individual channel responses includes: applying a predetermined weight (304) to said first antenna element; estimating a combined channel response (208) for a channel between a first base station of interest and an output of said combiner while said predetermined weight is being applied; and calculating an individual channel response for a channel between said first base station of interest and said first antenna element using said estimated combined channel response (see figs. 2, 5 element 208 and col.7, lines 13 and col.8, lines 1-25).

As per claim 4, Thomas et al does teach calculating an individual channel response includes determining a weight previously applied to said first antenna element and using said previously applied weight to calculate said individual channel response (see figs.3, 5).

As per claim 5, Thomas et al does teach: said weight is a complex weight having a magnitude-related component and a phase-related component (see fig.3 element 304).

As per claims 6, 14, 21 Thomas et al does teach said interference-related quality criterion includes a signal to interference and noise ratio (SINK) (see col.4, line 2).

As per claim 7, Thomas et al does teach said interference-related quality criterion includes a bit error rate (BER) (see col.4, lines 1-2).

As per claim 8, Thomas et al does teach said interference-related quality criterion includes a mean square error (MSE) (see col.16, line 18)

As per claim 9, Thomas et al does teach determining a weight includes selecting a weight from a predefined set of possible weights.

As per claim 11, 16, Thomas et al does teach repeating estimating a combined channel response and calculating individual channel responses for each of a plurality of base stations of interest (see figs 2, 5).

As per claim 12, Thomas et al does teach estimating a combined channel response includes identifying and using a pilot signal received from said first base station of interest (see abstract and figs. 2,5).

As per claim 13, Thomas et al does teach applying a predetermined weight includes forcing a magnitude associated with said first antenna element to zero (see fig.3 element 304).

As per claims 17, 18 Thomas et al does teach calculating individual channel responses includes using antenna weight information from a previous time period (see figs. 2, 3 and 5).

As per claim 19, Thomas et al inherently teaches calculating individual channel responses includes solving M equations in M unknowns, where M is an integer greater than 1.

As per claim 20, Thomas et al inherently teaches calculating individual channel responses includes solving the following system of equations for C1(t=nT): h, (t) = WC, (t) t E [nT, nT + I hl (t) = W(n,)TC, (t) t E [(n -1)T +I, nT) where hl(t) is the estimated combined channel response for the first base station of interest at time t, W(„_I)T is the calculated vector gain of the antenna elements during previous period [(n-1)T+z , nT), C1(t) is the matrix channel response of the first base station of interest for each of the antenna elements at time t, and W is the vector gain of the antennas using the predetermined weight.

As per claim 22, Thomas et al does teach repeating applying a predetermined weight, estimating a combined channel response, calculating individual channel responses, determining a new weight, and applying said new weight for a subsequent time period (see figs. 2, 3, 5).

As per claim 23, Thomas et al does teach communication device comprising: first and second antenna elements (see fig.2 element 101), said first antenna element having an adjustable weight; a combiner to combine (see fig.2 element 202) outputs of said first and second antenna elements to generate a combined signal; and a controller to control (see fig.2 element 210) said adjustable weight of said first antenna element, said controller including: a first unit to determine individual channel responses (see fig.2 element 208) for said first and second antenna elements for

each of a plurality of base stations of interest; and a second unit to determine a weight (see fig.3 element 304) for said first antenna element that optimizes an interference-related quality criterion using the individual channel responses (see col.3, lines 20-33).

As per claim 24, Thomas et al does teach at least one additional antenna element (see fig.2), wherein said combiner combines outputs of said first antenna element, said second antenna element, and said at least one additional antenna element to generate said combined signal and wherein said first unit determines individual channel responses for said first antenna element, said second antenna element, and said at least one additional antenna element for each of the base stations of interest.

As per claim 25 , Thomas et al does teach said controller repeatedly updates said weight of said first antenna element (see fig.2).

As per claim 26, Thomas et al inherently teaches said controller updates said weight of said first antenna element at intervals that depend upon a Doppler rate associated with said communication device.

As per claim 27, Thomas et al does teach interference-related quality criterion includes a signal to interference and noise ratio (SINR) (see col.4, line 2).

As per claim 28, Thomas et al does teach first unit regularly applies a predetermined weight to said first antenna element for use in determining said individual channel responses (see fig. 2).

As per claim 29, Thomas et al does teach said first unit determines said individual channel responses for said first and second antenna elements using a combined channel response for said first and second antenna elements for each base station of interest (see fig.2).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Petrus U.S. Patent No 6,177,906 teaches a mulitmode iterative adaptive smart antenna.

Karlsson et al U.S. Patent No 6,167039 teaches a mobile station.

Maruta et al U.S. Patent No 6,665,286 B1 teaches an adaptive receiving device.

Yukitomo et al U.S. Patent No 6,191,736 B1 teaches a data communication apparatus and method.

Tsutsui et al U.S. Patent No 6,385,181 B1 teaches an array antenna.

Wengler PUB No 2002/0181627 A1 teaches a diversity gain.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour , can be reached on (703) 306-3034. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Emmanuel Bayard

Primary Examiner

January 5, 2004